CLAIMS

1. A formulation based on the PTFE, homopolymer or modified, comprising:

1) latex of said PTFE having a particle diameter between 5 and 100 nm, comprising an anionic fluorinated surfactant in an amount in the range 2-25% by weight based on the PTFE, preferably 3-20% by weight;

2) a non ionic fluorinated surfactant added to the PTFE latex in an amount in the range 18-60% by weight based on the PTFE, preferably 25-45% by weight.

2. A formulation according to claim 1, wherein the anionic fluorinated surfactants are selected from:

$$T\text{-}O\text{-}R_f\text{-}CFX\text{-}COOM \qquad (IA)$$

wherein: X=F, CF_3; M=H, NH_4, Na, Li, K;

T is a C_1-C_3 (per)fluoroalkyl group, optionally containing one Cl atom; preferably it is selected from $-CF_3$, $-C_2F_5$, $-C_3F_7$, $-CF_2Cl$, $-C_2F_4Cl$, $-C_3F_6Cl$; optionally one or two F atoms can be replaced by H;

R_f is a (per)fluoropolyoxyalkylene radical having a number average molecular weight M_n in the range 200-2,000, preferably 350-1,000; R_f is selected in particular from the following classes:

(a) $-(CF_2CF(CF_3)O)_m(CFXO)_n-$

wherein m and n are integers such that the n/m ratio

is in the range 0.01-0.5 and the molecular weight is in the above range;

(b) $-(CF_2CF_2O)_p(CF_2O)_q-$

wherein p and q are integers such that the q/p ratio is in the range 0.5-2 and the molecular weight is in the above range;

(c) $-(CF_2CF(CF_3)O)_r-(CF_2CF_2O)_s-(CFX^{II}O)_t-$

wherein r, s and t are integers such that r+s is in the range 1-50, the t/(r+s) ratio is in the range 0.01-0.05 and the molecular weight is in the above range;

(d) $-(CF(CF_3)CF_2O)_u-$

wherein u is an integer such that the molecular weight is in the above range;

(e) $-(CYZ-CF_2CF_2O)_v-$

wherein Y and Z, equal to or different from each other, are F, Cl or H; v is a number such that the molecular weight is in the above range;

(f) $-(CF_2CF_2O)_w-$

w is a number such that the molecular weight is in the above range.

3. A formulation according to claim 2, wherein the anionic fluorinated surfactants (IA) are the compounds having R_f of type (a):

$$T\text{-}O\text{-}(C_3F_6O)_m(CF_2O)_n\text{-}CF_2\text{-}COOM$$

4. A formulation according to claims 1-3, wherein the compounds of formula (IA) are used in admixture with the following anionic surfactants:

$$CF_3(CF_2)_nCOOM \qquad (IIA)$$

wherein n can range between 4 and 12,

$$F\text{-}(CF_2\text{-}CF_2)_n\text{-}CH_2\text{-}CH_2\text{-}SO_3M \qquad (IIIA)$$

wherein M=H, NH_4, Na, Li, K and n can range between 2 and 5.

5. A formulation according to claims 1-4, wherein the non ionic fluorinated surfactants added to the PTFE polymerization latex have the following structures:

$$CF_3(CF_2)_y\text{-}L\text{-}R_h \qquad y=3\text{-}20 \qquad (IB)$$

$$T\text{-}O\text{-}R_f\text{-}L\text{-}R_h \qquad (IIB)$$

wherein:

R_f is selected from the structures (a),(b),(c),(d),(e), (f) of claim 2;

L is a divalent organic group, a linking group between R_f and R_h, selected from: $-CO\text{-}NR^1\text{-}$, $-CH_2(OCH_2CHR^2)_a\text{-}O\text{-}$, $-CH_2(OCH_2CHR^2)_b\text{-}O\text{-}CO\text{-}$, $-CH_2O\text{-}(CH_2)_c\text{-}CO\text{-}O\text{-}$, $-CH_2\text{-}CH_2\text{-}O\text{-}$, $-CH_2\text{-}CH_2\text{-}$; wherein R^1 is -H or a $C_1\text{-}C_4$ alkyl; R^2 is -H or a $C_1\text{-}C_2$ alkyl; a, b are numbers from 0 to 6, preferably from 0 to 2; c is a number from 1 to 3;

R_h is a radical having a polyoxyalkylene structure sele-

cted from:

(i) $-(CH_2CH_2O)_qCH_2CH_2Z$, wherein: q is an integer from 5 to 70, preferably from 6 to 25; Z is selected from -OH, C_1-C_4 alkoxy;

(ii) $-(CH_2CH_2O)_r(CH_2CH(CH_3)O)_sCH_2CHR^3Z$, wherein r+s is an integer from 5 to 70, preferably from 10 to 50; the r/s ratio is in the range 0.1-10, preferably 0.5-5; R^3 is selected between -H and $-CH_3$; Z is selected between -OH, C_1-C_4 alkoxy;

6. A formulation according to claim 5, wherein the non ionic surfactants are:

- the compounds of structure (IB) with y=5, L=$-CH_2-CH_2-O-$, R_h=$-(CH_2CH_2O)_qCH_2CH_2OH$ wherein q=6;

- the compounds of structure (IIB) having R_f of structure (a) with T=$-C_3F_6Cl$, m and n such to give a molecular weight in the range 450-650; L=-CONH-; R_h= $-(CH_2CH_2O)_qCH_2CH_2OCH_3$ wherein q=21.

7. A formulation according to claims 1-6, wherein the PTFE is modified with one or more comonomers containing at least one unsaturation of ethylene type in an amount up to 6% molar, preferably up to 1% molar.

8. A formulation according to claim 7, wherein the comonomers are of both hydrogenated and fluorinated type.

9. A formulation according to claim 8, wherein the hydroge-

nated comonomers are selected from ethylene, propylene, acrylic monomers, styrene monomers.

10. A formulation according to claim 8, wherein the fluorinated comonomers are selected from:

- C_3-C_8 perfluoroolefins;
- C_2-C_8 hydrogenated fluoroolefins, such as vinyl fluoride (VF), vinylidene fluoride (VDF), trifluoroethylene, hexafluoroisobutene, perfluoroalkylethylene $CH_2=CH-R_f$, wherein R_f is a C_1-C_6 perfluoroalkyl;
- C_2-C_8 chloro- and/or bromo- and/or iodo-fluoroolefins;
- $CF_2=CFOR_f$ (per)fluoroalkylvinylethers (PAVE), wherein R_f is a C_1-C_6 (per)fluoroalkyl;
- $CF_2=CFOX$ (per)fluoro-oxyalkylvinylethers, wherein X is: a C_1-C_{12} alkyl, or a C_1-C_{12} oxyalkyl, or a C_1-C_{12} (per)fluoro-oxyalkyl having one or more ether groups; fluorodioxoles, preferably perfluorodioxoles.

11. A formulation according to claim 10, wherein the fluorinated comonomers are perfluoromethoxydioxole (MDO), perfluoropropylvinylether (PPVE), perfluoromethylvinylether (PMVE) and perfluoropropene (PFP).

12. Dielectric films obtained from the formulation according to claims 1-11, by the deposition of the formulation on

a substratum, subsequent film sintering at a temperature higher than the PTFE melting T and subsequent air-cooling.

13. Dielectric films according to claim 12, wherein the deposition is carried out by spin coating at a spinning rate in the range 3,000-10,000 rpm for a time comprised between 30 seconds and 5 minutes and in which the sintering temperature is higher than 320°C, preferably in the range 390°C-410°C.

14. Dielectric films according to claims 12-13 having a thickness lower than 200 nm, preferably in the range 50 nm-150 nm, a dielectric constant lower than 2.2, a dielectric strength higher than 4 MV/cm and a weight loss at 425°C in the range 0.0008-0.02%/min.

15. Use of dielectric films according to claims 12-14 for the insulation of conductors in integrated circuits.